IN THE CLAIMS

The following listing of claims will replace all prior versions, and listings, of claims in this application.

Listing of the Claims:

Claims 1-21 (Cancelled).

22. (Original) An isolated polypeptide comprising SEQ ID NO:2.

Claims 23-25 (Cancelled).

26. (Currently Amended) An N-acetylglycosamine-1-phosphotransferase (GlcNAc-phosphotransferase) ~~GlcNAc-phosphotransferase~~ comprising an α subunit, a β subunit and a site-specific proteolytic cleavage site interposed between said α and β subunits, wherein said site-specific proteolytic cleavage site is not endogenous to GlcNAc-phosphotransferase,

wherein said α subunit is encoded by nucleotides 165 to 2948 of SEQ ID NO:3, or a sequence that hybridizes under stringent conditions to the complement of nucleotides 165 to 2948 of SEQ ID NO:3, wherein said stringent conditions comprise hybridization in 50% formamide, 1M NaCl, 1% SDS at 37°C and washing in 0.1 X SSC at 60 to 65°C and which encodes a protein when combined with a β subunit protein encoded by nucleotides 2949 to 2932 of SEQ ID NO:3 has GlcNAc-phosphotransferase activity; and

wherein said β-subunit is encoded by nucleotides 2949 to 3932 of SEQ ID NO:3, or a sequence that hybridizes under stringent conditions to the complement of nucleotides 2949 to 3932 of SEQ ID NO:3, wherein said stringent conditions comprise hybridization in 50% formamide, 1M NaCl, 1% SDS at 37°C and washing in 0.1 X SSC at 60 to 65°C and which encodes a protein when combined with an α subunit protein encoded by nucleotides 165 to 2948 of SEQ ID NO:3 has GlcNAc-phosphotransferase activity.

Claims 27-29 (Cancelled).

30. (Previously Presented) The GlcNAc-phosphotransferase of Claim 26, wherein said α-subunit comprises amino acids 1-928 of SEQ ID NO:4.

31. (Currently Amended) The GlcNAc-phosphotransferase of Claim 26, wherein said β subunit comprises amino acids 1 to 328 of SEQ ID NO:5.

32. (Original) The GlcNAc-phosphotransferase of Claim 26, wherein said GlcNAc-phosphotransferase further comprises a γ subunit.

Claim 33 (Cancelled).

34. (Original) The GlcNAc-phosphotransferase of Claim 32, wherein said γ subunit comprises the amino acid sequence of SEQ ID NO:7.

35. (Currently Amended) The GlcNAc-phosphotransferase of Claim 26, wherein said site-specific proteolytic cleavage site is selected from the group consisting of a Furin proteolytic cleavage site, a Factor Xa proteolytic cleavage site, a Enterokinase proteolytic cleavage site, and a ~~Genease~~ Genenase I proteolytic cleavage site.

36. (Original) The GlcNAc-phosphotransferase of Claim 35, wherein said site-specific proteolytic cleavage site is a Furin proteolytic cleavage site.

37. (Currently Amended) The GlcNAc-phosphotransferase of Claim 36, wherein said Furin proteolytic cleavage site comprises SEQ ID NO:24.

Claims 38-55 (Cancelled).

56. (Currently Amended) A method of phosphorylating a lysosomal hydrolase protein comprising an asparagine-linked oligosaccharide with a high mannose structure, the method comprising contacting said lysosomal hydrolase protein with the isolated polypeptide of Claim 22 for a time and under conditions suitable to produce a phosphorylated lysosomal hydrolase protein.

Claims 57-69 (Cancelled).

70. (Currently Amended) The method of Claim 5669, wherein said lysosomal hydrolase protein ~~enzyme~~ is selected from the group consisting of α-glucosidase, α-L-iduronidase, ~~β~~α-galactosidase A, arylsulfatase, N-acetylgalactosamine-α -sulfatase, β-galactosidase, iduronate 2-sulfatase, ceramidase, galactocerebrosidase, β -glucoronidase, Heparan N-sulfatase, N-Acetyl-α-glucosaminidase, Acetyl CoA-α-glucosaminide N-acetyl transferase, N-acetyl-glucosamine-6 sulfatase, Galactose 6-sulfatase, Arylsulfatase A, Arylsulfatase B, Arylsulfatase C, Arylsulfatase A Cerebroside, Ganglioside sialidase, Acid β-galactosidase G_{M1} Ganglioside~~Galglioside~~, Acid β-galactosidase, Hexosaminidase A, Hexosaminidase B, α-fucosidase, α-N-Acetyl galactosaminidase, Glycoprotein Neuraminidase, Aspartylglucosamine amidase, Acid Lipase, Acid Ceramidase, Lysosomal Sphingomyelinase , Sphingomyelinase, and Glucocerebrosidase β-Glucosidase.

71. (Currently Amended[The method of Claim 56, further comprising contacting said phosphoryalated protein with an isolated N-acetylglucosamine-1-phosphodiester-N-Acetylglucosaminidase (phosphodiester α-GlcNAcase)~~phosphodiester α-GlcNAcase~~.

72. (Previously Presented) The method of Claim 71, wherein said phosphodiester α-GlcNAcase comprises the amino acid sequence of SEQ ID NO:18.

73. (Currently Amended) The method of Claim 71, wherein said phosphodiester α-GlcNAcase is encoded by a nucleotide sequence comprising SEQ ID NO:17 or a nucleotide sequence that hybridizes under stringent conditions to the complement of SEQ ID NO:17, wherein said stringent conditions comprise hybridization in 50% formamide, 1M NaCl, 1% SDS at 37°C and washing in 0.1 X SSC at 60 to 65°C, and which encodes a protein with phosphodiester α-GlcNAcase activity.

74. (Currently Amended) The method of Claim 56, wherein prior to said contacting the method comprises: culturing a host cell which comprises ~~an isolated~~ a polynucleotide

encoding ~~soluble GlcNAc-phosphotransferase~~ the polypeptide for a time under conditions suitable for expression of the polypeptide~~soluble GlcNAc-phosphotransferase~~; and isolating said ~~soluble GlcNAc-phosphotransferase~~polypeptide.

75. (Currently Amended) The method of Claim 56, wherein prior to said contacting the method comprises culturing a host cell which comprises ~~an isolated~~ a polynucleotide encoding ~~soluble GlcNAc-phosphotransferase~~ the polypeptide for a time under conditions suitable for expression of the ~~soluble GlcNAc-phosphotransferase~~ polypeptide~~, wherein said soluble GlcNAc-phosphotransferase comprises an αsubunit, a β subunit and a site-specific proteolytic cleavage site interposed between said α and β subunits, wherein said proteolytic cleavage site is not endogenous to GlcNAc-phosphotransferase~~;isolating said ~~soluble GlcNAc-phosphotransferase~~polypeptide; cleaving said isolated ~~soluble GlcNAc-phosphotransferase~~polypeptide with a proteolytic enzyme specific for ~~said~~ a proteolytic cleavage site interposed between a first and second portion of said polypeptide wherein the first portion comprises an α subunit of the GlcNAc phosphotransferase and the second portion comprises a β subunit of the GlcNAc phosphotransferase; and mixing said α and βsubunits with a γ subunit of GlcNAc-phosphotransferase.

76. (Currently Amended) A method of phosphorylating a lysosomal hydrolase protein comprising an asparagines-linked oligosaccharide with a high mannose structure, the method comprising contacting said protein with the ~~isolated polypeptide~~GlcNAc phosphotransferase of Claim 26 for a time and under conditions suitable to produce a phosphorylated protein.

Claims 77-80 (Cancelled).

81. (Previously Presented) The method of Claim 76~~78~~, wherein said α-subunit comprises amino acids 1-928 of SEQ ID NO:4.

82. (Currently Amended) The method of Claim 76 ~~78~~, wherein said β subunit comprises amino acids 1 to 328 of SEQ ID NO:5.

83. (Previously Presented) The method of Claim 76 ~~78~~, wherein said soluble GlcNAc-phosphotransferase further comprises a γ subunit.

84. (Previously Presented) The method of Claim 83, wherein said γ subunit is encoded by SEQ ID NO:6, or a nucleotide sequence that hybridizes under stringent conditions to the complement of SEQ ID NO:6, wherein said stringent conditions comprise hybridization in 50% formamide, 1M NaCl, 1% SDS at 37°C and washing in 0.1 X SSC at 60 to 65°C.

85. (Previously Presented) The method of Claim 83, wherein said γ subunit comprises the amino acid sequence of SEQ ID NO:7.

86. (Currently Amended) The method of Claim 76, wherein said site-specific proteolytic cleavage site is selected from the group consisting of a Furin proteolytic cleavage site, a Factor Xa proteolytic cleavage site, a Enterokinase proteolytic cleavage site, and a ~~Genease~~ Genenase I proteolytic cleavage site.

87. (Previously Presented) The method of Claim 86, wherein said site-specific proteolytic cleavage site is a Furin proteolytic cleavage site.

88. (Previously Presented) The method of Claim 87, wherein said Furin proteolytic cleavage site comprises SEQ ID NO:24.

Claim 89. (Cancelled)

90. (Currently Amended) The method of Claim 76 ~~89~~, wherein said lysosomal hydrolase protein ~~enzyme~~ is selected from the group consisting of α-glucosidase, α-L-iduronidase, ~~β~~α-galactosidase A, arylsulfatase, N-acetylgalactosamine-α -sulfatase, β-galactosidase, iduronate 2-sulfatase, ceramidase, galactocerebrosidase, β -glucoronidase, Heparan N-sulfatase, N-Acetyl-α-glucosaminidase, Acetyl CoA-α-glucosaminide N-acetyl

transferase, N-acetyl-glucosamine-6 sulfatase, Galactose 6-sulfatase, Arylsulfatase A, Arylsulfatase B, Arylsulfatase C, Arylsulfatase A Cerebroside, Ganglioside sialidase, Acid β-galactosidase G_{M1} Ganglioside~~Galglioside~~, Acid β-galactosidase, Hexosaminidase A, Hexosaminidase B, α-fucosidase, α-N-Acetyl galactosaminidase, Glycoprotein Neuraminidase, Aspartylglucosamine amidase, Acid Lipase, Acid Ceramidase, Lysosomal Sphingomyelinase , Sphingomyelinase, and Glucocerebrosidase β-Glucosidase.

91. (Previously Presented) The method of Claim 76, further comprising contacting said phosphoryalated protein with an isolated phosphodiester α-GlcNAcase.

92. (Previously Presented) The method of Claim 91, wherein said phosphodiester α-GlcNAcase comprises the amino acid sequence of SEQ ID NO:18.

93. (Previously Presented) The method of Claim 91, wherein said phosphodiester α-GlcNAcase is encoded by a nucleotide sequence comprising SEQ ID NO:17 or a nucleotide sequence that hybridizes under stringent conditions to the complement of SEQ ID NO:17, wherein said stringent conditions comprise hybridization in 50% formamide, 1M NaCl, 1% SDS at 37°C and washing in 0.1 X SSC at 60 to 65°C.

94. (Currently Amended) The method of Claim 76~~96~~, wherein prior to said contacting the method comprises: culturing a host cell which comprises ~~an isolated~~ a polynucleotide encoding ~~soluble~~ the GlcNAc-phosphotransferase for a time under conditions suitable for expression of the ~~soluble~~ GlcNAc-phosphotransferase; and isolating said ~~soluble~~ GlcNAc-phosphotransferase.

95. (Currently Amended) The method of Claim 76, wherein prior to said contacting the method comprises culturing a host cell which comprises ~~an isolated~~ a polynucleotide encoding ~~soluble~~ the GlcNAc-phosphotransferase for a time under conditions suitable for expression of the ~~soluble~~ GlcNAc-phosphotransferase~~, wherein said soluble GlcNAc-~~

~~phosphotransferase comprises an αsubunit, a β subunit and a site specific proteolytic cleavage site interposed between said α and β subunits, wherein said proteolytic cleavage site is not endogenous to GlcNAc-phosphotransferase~~; isolating said ~~soluble~~ GlcNAc-phosphotransferase; cleaving said isolated ~~soluble~~ GlcNAc-phosphotransferase with a proteolytic enzyme specific for said proteolytic cleavage site; and mixing said α and βsubunits with a γ subunit of GlcNAc-phosphotransferase.